D.9 NANCY GRACE ROMAN TECHNOLOGY FELLOWSHIPS IN ASTROPHYSICS FOR EARLY CAREER RESEARCHERS

1. Overview

The goals of the Nancy Grace Roman Technology Fellowship (RTF) program in Astrophysics are to give early career researchers the opportunity to develop the skills necessary to lead astrophysics flight instruments/projects and become principal investigators (PIs) of future astrophysics missions; to develop innovative technologies that have the potential to enable major scientific breakthroughs; and to foster new talent by putting early-career instrument builders on a trajectory towards long-term positions.

Institutions and organizations are encouraged to submit proposals under the RTF program on behalf of their outstanding early career researchers, including postdoctoral researchers, nontenured faculty members, term civil servants, and employees, who intend to develop careers involving Astrophysics innovation and technology development, with the individual as the PI.

The RTF awards will be issued as grants, except in the case of Government employees who will be directly funded.

The RTF is structured into three components with specific gates for entering the next phase. The first component is an initial one-year Concept Study to generate the detailed plans and commitments for developing the proposed astrophysics technology (Section 3.2). The final report from the Concept Study, due nine-months after the start of the award, will be peer reviewed and a subset of the Technology Fellows will be selected to continue the fellowship and implement the plans conceived during the Concept Study. This Development Effort (Section 3.3) is for an additional four-years. Finally, a third opportunity is available to Fellows in the four-year Development Effort to apply for start-up funds (Section 3.4) when they obtain a tenure-track, permanent civil service, or equivalent position.

Note: Each year, NASA selects nominees for Presidential Early Career Awards for Scientists and Engineers (PECASE) from the exceptionally meritorious awardees sponsored by its research programs. PECASE awards recognize outstanding scientists and engineers who, early in their career, show exceptional potential for leadership at the frontiers of knowledge. Each Presidential award is of five-years duration. NASA does not issue a special announcement for the PECASE award. The awardees of the RTF Program constitute one (but not the only) source of nominations for the PECASE by the Astrophysics Division. If an RTF awardee is selected for the PECASE award, the duration for the combined honor is five years. Conversely, a current or former recipient of a PECASE award is not eligible to apply to the RTF.

2. Eligibility

To be eligible for an RTF award, proposal PIs must meet the following requirements:

- Be a recent Ph.D. recipient, defined as having graduated on or after January 1 of a year that is no more than seven years before the issuance date of this ROSES NRA. Individuals who have interrupted their careers for substantive reasons, such as family leave or serious health problems, and are more than seven years beyond the receipt of their Ph.D. degrees, may also be eligible. These applicants are encouraged to obtain prior concurrence from NASA before proposal submission.

- Be in an early career position such as a postdoctoral, tenure-track, term civil service, or an equivalent nontenured position, as long as the employing institution assumes the responsibility of submitting the proposal with the individual as the proposed PI. In the event that a proposer's institution does not allow nontenured faculty or postdoctoral researchers to apply independently for NASA grants, the proposal may include a mentor as the "Institutional PI" with the fellowship applicant as the "Science PI," as outlined in Section 1.4.2 of the *NASA Guidebook for Proposers.*

- Be a U.S. citizen or have lawful status of permanent residency (i.e., holder of a U.S. Permanent Resident Card, also referred to as the Green Card)[1] in order to support the RTF goal of fostering new talent by putting early-career instrument builders on a trajectory towards long-term positions at a U.S. institution.

- Not hold or have held a career civil service[2], tenure, or equivalent position on or before the submission deadline of this program.

- Not be a current or former recipient of the RTF or a PECASE award.

3. Programmatic Information

3.1 Evaluation Criteria

The proposed research will be evaluated on how well it addresses the goals of the RTF program: to give early career researchers the opportunity to develop the skills necessary to lead a flight instrument/project and become principal investigators of future missions; to develop innovative technologies that have the potential to enable major scientific breakthroughs; and to foster new talent by putting early-career instrument builders on a trajectory towards long-term positions.

[1] The prospective fellow may submit a proposal to RTF if he or she is reasonably certain that the Green Card will be in hand soon after the proposal submission. The evaluation of proposals and announcement of selection takes approximately three-four months. NASA will not make an award if the submitting institution cannot certify the prospective fellow's eligibility.

[2] Both career conditional and career tenure civil servant appointments are referred to in this solicitation as simply career civil servants. The RTF program does not differentiate between these two types of appointments.

Proposals submitted to NASA in response to this solicitation will be evaluated with respect to the criteria specified in Appendix C of the NASA *Guidebook for Proposers*, which are intrinsic merit, relevance, and cost realism/reasonableness. In addition to the factors for intrinsic merit given in the NASA *Guidebook for Proposers*, intrinsic merit includes the following factors:

- The long-term commitment to the early career researcher's career development by the employing institution.
- Novel technology likely to enable innovative future Astrophysics missions. The proposed technology may be part of a suborbital activity, as long as the prospective fellow has a leading role in developing the technology and the proposed development effort is distinct from the separately funded suborbital activity.
- The wider application of the technology to other NASA programs, as well as national needs supported by other Government agencies (such as the Department of Homeland Security, Department of Energy, etc.).

Relevance will be judged on the basis of the proposed technology to advance one or more of the three Astrophysics science themes: Cosmic Origins, Exoplanet Exploration, and Physics of the Cosmos.

3.2 Submission of Proposals for Concept Study

The one-year Concept Studies are intended for the fellow to develop more definitive information regarding the cost, risk, and feasibility of the proposed investigation. The content and format of the Concept Study proposal should follow the *NASA Guidebook for Proposers* with the following additional guidance:

- The proposal should include a rough estimate of the budget required for the four-year Development Effort, in addition to the detailed budget for the Concept Study.

- The proposal should include a letter from the host institution indicating it recognizes that a substantial institutional commitment for laboratory space and other institutional resources will be required for the four-year Development Effort. The proposal should also contain a plan for obtaining firm institutional commitments for such laboratory space and other institutional resources that will be required for the subsequent four-year Development Effort.

- The proposal should be for duration of two years, but only request support for up to one year. Support beyond the first year will be contingent upon a successful request, submitted nine-months after the award of the Concept Study, for entering the four-year Development Effort.

The award amount for the Concept Study is judged according to the scope of the proposed work and the overall competition. Funds may be used for fellow's salary; support of students (undergraduate or graduate) and/or postdoctoral fellows who are involved in the proposed research; research expenses such as costs incurred in field experiments; purchase of equipment and/or supplies, computing, travel, etc. If research collaboration is a component of the proposal,

it is presumed that the collaborator(s) have their own means of research support; that is, an RTF award may not include expenses for personnel or activities at collaborating institutions, nor salary costs for other senior personnel.

3.3 Submission of Concept Study Report for Entering the Development Effort

Recipients of a Concept Study RTF will be eligible to apply for a four-year Development Effort to implement the plans developed during the Concept Study. Funding for years beyond the first is contingent on availability of funds and satisfactory progress, assessed through the normally required annual progress reports and a review towards the end of the second year that will be based on milestones defined in the proposal. Fellows should request Development Effort support in their final Concept Study Report submitted to NASA nine-months after the award of the Concept Study through NSPIRES (instructions will be provided to the PI). The content and format of the Concept Study Report are the same as those for a full proposal as described in the *NASA Guidebook for Proposers.* The Concept Study Report will be peer reviewed and a subset of the Technology Fellows will be selected to continue the fellowship and implement the plans conceived during the Concept Study.

The award amount for the Development Effort is judged according to the scope of the proposed work and the overall competition. Funds may be used for the fellow's salary, support of students (undergraduate or graduate) and/or postdoctoral fellows who are involved in the proposed research, research expenses such as costs incurred in field experiments, purchase of equipment and/or supplies, computing, travel, etc. If research collaboration is a component of the proposal, it is presumed that the collaborator(s) have their own means of research support; that is, an RTF award may not include expenses for personnel or activities at collaborating institutions, nor salary costs for other senior personnel.

Researchers who are in tenure-track, career civil servant, or equivalent positions at the time of requesting the four-year Development Effort support may request salary support, plus up to $500k total (inclusive of institutional indirect costs) for capital equipment or other project costs. Researchers who are not in tenure-track or equivalent positions (such as term civil servants) may request full salary support for up to four years, plus up to $300k total (inclusive of institutional indirect costs) for capital equipment or other project costs. As discussed above, salary and other expenses should be responsive to NASA's evaluation criteria on cost realism and reasonableness.

The Concept Study Report and the request for Development Effort support must include an institutional commitment for laboratory space and other institutional resources required for the proposed work. NASA strongly encourages, but does not require, that the submitting institution contribute to the cost of the proposed project. Of special interest is support by the employing institution that would provide paid release time to enable the applicant to more fully concentrate on the activities related to the proposal. Institutional support of equipment purchase and co-funding of student and/or postdoctoral support would also be recognized as a valuable contribution. Institutional commitments for these resources should be included in the Report.

3.4 Submission of Requests for Start-up Funds

Active fellows who obtain a tenure-track, career civil servant, or equivalent position at an institution of their choice during their four-year Development Effort may request up to $200K (inclusive of indirect costs) in laboratory start-up funds (this is in addition to the $300K included in the development effort request). This funding is not guaranteed and is subject to peer review.

The start-up support is intended to aid Fellows in establishing a research group and/or laboratory in their new position, enabling Fellows to continue their NASA-funded investigation. The funds may be used to purchase laboratory equipment, provide salary for the Fellow, as well as students and research associates, and cover other expenses associated with establishing research efforts. Requests for start-up funds may not include expenses for personnel or activities at collaborating institutions, nor salary costs for other senior personnel.

To request start-up funds, Fellows should provide a short proposal detailing the research group they plan to establish upon starting a tenure-track, career civil servant, or equivalent position. Fellows should submit their proposals for start-up funds through NSPIRES under the sponsorship of the institution at which they have obtained their new position (instructions will be provided to the PI). The proposal must describe any needed equipment and facilities and anticipated staffing plans (including the role of undergraduate students, graduate students, and postdoctoral researchers). The proposal must contain a strategy describing how the Fellow plans to sustain the research group or laboratory over the long term. A detailed budget with a narrative justification is required as part of the proposal. Fellows should also describe how the planned research group would benefit NASA and further its goals.

NASA strongly encourages, but does not require, that the submitting institution contribute to the cost of the proposed project. Of special interest is support by the employing institution that would provide release time to enable the applicant to concentrate more fully on the activities related to the proposal. Institutional support of equipment purchase and co-funding of student and/or postdoctoral support would also be recognized as a valuable contribution. Institutional commitments for laboratory space, matching or startup funds, and other institutional resources required for the proposed work should be included in the proposal.

Proposals for start-up funds may be submitted at any time the Fellow meets the requirements described above.

4. Summary of Key Information

Expected program budget for first year of new awards	Concept Studies: $0.9M (FY 2012) Development Phase $1.2M (FY 2013)
Number of new awards pending adequate proposals of merit	About 3-6 for the study phase; about 4 for the development phase

Maximum duration of awards	Two years for a new study phase; the four-year Development Effort would augment the original award and extend the period of performance; start-up funds for a current fellow would augment the original award without extending the period of performance.
Supplemental EPO Eligibility	Yes, for awards >1 year; see Appendices E.5 and E.6
Due date for Notice of Intent to propose (NOI)	October 7, 2011
Due date for proposals	November 18, 2011
Planning date for start of investigation	6 months after proposal due date.
Page limit for the central Science-Technical-Management section of proposal	See Chapter 2 of the *2011 NASA Guidebook for Proposers*
Relevance	This program is relevant to the astrophysics science strategic goals and subgoals in NASA's *Strategic Plan*; see Table 1 and the references therein. Proposals that are relevant to this program are, by definition, relevant to NASA.
General information and overview of this solicitation	See the *ROSES Summary of Solicitation*.
Detailed instructions for the preparation and submission of proposals	See the *NASA Guidebook for Proposers* at http://www.hq.nasa.gov/office/procurement/nraguidebook/.
Submission medium	Electronic proposal submission is required; no hard copy is required or permitted. See Section IV of the *ROSES Summary of Solicitation* and Chapter 3 of the *NASA Guidebook for Proposers*.
Web site for submission of proposal via NSPIRES	http://nspires.nasaprs.com/ (help desk available at nspires-help@nasaprs.com or (202) 479-9376)
Web site for submission of proposal via Grants.gov	http://grants.gov (help desk available at support@grants.gov or (800) 518-4726)
Funding opportunity number for downloading an application package from Grants.gov	NNH11ZDA001N-RTF
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